Use, abuse and dependence of ecstasy and related drugs in adolescents and young adults – a transient phenomenon? Results from a longitudinal community study

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Abstract

Objective: To determine incidence and patterns of natural course of ecstasy/stimulant/hallucinogen (ESH) use and disorders as well as cohort effects in a community sample of adolescents and young adults. Method: Cumulative incidence and patterns of ecstasy use and disorders were examined in a prospective longitudinal design (mean follow-up period=42 months) in a representative sample (N=2446) aged 14–24 years at the outset of the study. Patterns of DSM-IV defined ESH use, abuse and dependence were assessed with the Munich Composite International Diagnostic Interview (M-CIDI). Results: (1) Cumulative lifetime incidence for use of ESH at second follow-up: 9.1%, 1.0% for abuse, 0.6% for dependence; (2) men used and abused ESH more often than women; (3) the younger birth cohort (1977–81) tended to start earlier with substance (ab)use compared to the older birth cohort (1970–77); (4) use of ESH was associated with increasing rates of concomitant use of other licit and illicit drugs; (5) the majority of the lifetime ESH users without disorder had stopped to use these substances and not consumed them during the 12 months preceding the second follow-up; (6) those who had stopped to take ecstasy and related drugs at follow-up also took other illicit drugs less often than those who continued to consume ESH. Conclusions: Use of designer drugs is widespread in our sample, but the probability of developing use disorders is fairly low (1.6%). The majority of the ESH users stopped their use spontaneously in their twenties (80% of the prior users without disorder, 67% of the prior abusers), but 50% of those that once had fulfilled DSM-IV criteria of dependence continued to use these substances.

Keywords: Ecstasy; Stimulants; Hallucinogens; Use; Abuse; Dependence; Longitudinal study; Gender; Cohort

1. Introduction

New synthetic ‘designer’ drugs are becoming increasingly popular among adolescents and young adults, especially ecstasy (mostly taken as a tablet which contains amphetamine derivates, especially MDMA but as well MDE or MDA) (Pederson and Skrondal, 1999).

In scientific as well as in popular texts there is a great controversy if ecstasy is a relatively benign (and even psychotherapeutically effective) substance (Szukaj, 1994) or a dangerous neurotoxin (McCann et al., 1998). There is also a lack of knowledge concerning the incidence and prevalence of ecstasy use and use disorders in the general population. Research deficits are mainly due to the fact that ecstasy studies mostly have highly selected samples (Cohen, 1996; Fischer, 2000; Green et al., 1995; Jansen, 1999; McGuire et al., 1994; Schifano, 2000; Thomasius, 2000), usually do not have prospective longitudinal designs, do not use specified

diagnostic criteria for clinically relevant abuse or dependence patterns and focus on the initiation of ecstasy use, not on its reduction or cessation.

Studies with selected samples of ecstasy users or patients reveal that ecstasy users are polydrug users who reveal increased levels of psychopathology and suffer relatively often from slight cognitive impairment (Andresen et al., 2000; Parrott et al., 2000; Schifano et al., 1998; Schuetz et al., submitted, Thomasius, 2000; Topp et al., 1999; Tossmann, 1997).

Epidemiological studies about the use of ecstasy and related substances reveal that the lifetime-incidence of ecstasy use varied in European students aged 13–18 years in the mid-90s between 0% (e.g. Finland) and 8–12% (UK); it was 1% in Canada and 2% in the USA (Kokkevi et al., 2000a; Capsules, 1993; Pederson and Skrondal, 1999; Smart and Ogborne, 2000). In university students the variation is even higher: the lifetime use of ecstasy or 'designer drugs' is 1.6% in Spain (Martinez et al., 1999), 13% in the UK (Webb et al., 1996) and it had been 39% at Stanford University during the early 80s (Peroutka et al., 1987). In representative community samples of adolescents and adults in Europe the lifetime use varies between 0.2% (Greece) and 4.5% (Spain) (Christophersen, 2000; de la Fuente et al., 1997; EMCDDA, 1998; Kokkevi et al., 2000b). In Germany-West 1.7% of the population have tried designer drugs and of the 21–24-year-olds 6.5% have used amphetamins and 5.7% ecstasy (Kraus and Bauernfeind, 1998; Kraus et al., 1998).

Males report a 2–3-times higher lifetime use than females do (de la Fuente et al., 1997; Pederson and Skrondal, 1999). It seems that ecstasy is most popular in northern and central Europe (UK, Germany) and is becoming increasingly popular in the U.S. and Canada. The comparison of historical trends across various studies and countries is hampered by the fact that most studies do not refer to the concept of 'cohort' (a group defined by calendar year(s) of birth; Neugarten and Datan, 1973) and do not present the years of birth of their study participants.

To date, no representative population-based data are available concerning the prevalence of abuse and dependence of ecstasy except for preliminary results from our EDSP study (see below).

While there is a continuing discussion going on whether cannabis use is a transitional phenomenon in adolescence and young adulthood (Perkonigg et al., 1999; Sydow et al., in press), this discussion has not even been started with regard to ecstasy because there is a lack of prospective-longitudinal studies on that issue. But because ecstasy use is associated with a certain youth subculture (techno, rave parties) one can as well speculate if its use is a 'youth-limited' transitional or a permanent phenomenon. Therefore, it is a question of vital importance whether ecstasy users also tend to stop their drug consumption spontaneously in their 20s like about 50–60% of the cannabis users do (Chen and Kandel, 1998; Hammer and Vaglum, 1990; Johnston et al., 1992; Kandel and Faust, 1975; Kandel and Logan, 1984; Silbereisen, 1997; Sydow et al., in press) or whether they continue to use the drug over longer periods. Even more so since it seems that the cumulative lifetime dose of consumed ecstasy is related to neurological impairments (McCann et al., 1998; Thomasius, 2000).

It has also been shown that—at least in non-representative samples—ecstasy use is associated with increasing risks to use other illicit drugs, such as amphetamines, hallucinogens, stimulants and opiates (Parrott et al., 2000; Schifano et al., 1998; Solowij et al., 1992; Thomasius, 2000; Topp et al., 1999; Tossmann, 1997). Therefore, it is important to evaluate if

ex-ecstasy users who have stopped taking the drug compensate their ecstasy-abstinence with an increased consumption of other licit or illicit drugs.

The Early Developmental Stages of Psychopathology study (EDSP; Wittchen et al., 1998b; Lieb et al., 2000), a prospective-longitudinal community-study, examined the natural course of ecstasy (and related drugs) use in a representative sample of 14–24-year-olds in Munich, Germany. Ecstasy use results from the EDSP-baseline and 20 months prospective data for the younger cohort (initially aged 14–17 years) have already been presented. We have demonstrated that 1995 4% of the 14–24-year-old males and 2.3% of the females in Munich had tried ecstasy. The younger birth cohort started earlier and used ecstasy more often when compared to the older cohort. 0.8% fulfilled DSM-IV criteria for ecstasy (and related substances) use disorders. At baseline, almost one third of the lifetime consumers of ecstasy and related drugs had already stopped using these drugs—often motivated by fear of performance and health impairments (Schuster et al., 1998; Schuster and Wittchen, 1996). Further, it was demonstrated that consumers of ecstasy and related substances use illicit and licit drugs more often than other people, suffer more often from various mental disorders (abuse/dependence of alcohol, nicotine, illicit drugs; anxiety disorders; affective disorders; suicidal ideation; number of DSM-IV diagnoses) than those who do not use illicit drugs or those who take other illicit drugs (mostly cannabis) and visit mental health services more often. In 80% of the non-drug related disorders the participants stated that the mental disorder started before the ecstasy use was started (Schuetz et al., submitted).

The focus of this paper is to describe the natural course of use, abuse and dependence of ecstasy and related drugs (stimulants, hallucinogens) over a period of 4 years in a German sample of adolescents and young adults, aged 14–24 at baseline and 17–28 at follow-up (birth cohorts 1970–1981), highlighting gender, age and cohort effects. The following questions will be examined:

1. What is the age of onset of ecstasy/stimulant/hallucinogen use?
2. How prevalent is ecstasy/stimulant/hallucinogen use in adolescence and young adulthood?
3. How prevalent is ecstasy/stimulant/hallucinogen abuse and dependence according to DSM-IV criteria?
4. How stable are the patterns of ecstasy/stimulant/hallucinogen use, abuse and dependence across time, with emphasis on increases, reductions and spontaneous remissions?
5. Is the cessation of ecstasy/stimulant/hallucinogen use accompanied by a compensative increase in the use of other drugs or by a decrease?

2. Method

2.1. Design

The Early Developmental Stages of Psychopathology study (EDSP) (Wittchen et al., 1998b; Lieb et al., 2000) explores the prevalence, incidence, comorbidity, risk factors, protective factors and the 4-year course of mental disorders, with specific emphasis on substance- use disorders in a representative general population sample. The study is divided into three waves, spanning from 1995 (t0) to 1998–99 (t2).

2.2. Baseline sample and follow-up investigations

The sample was drawn randomly from the 1994 government registries of residents in metropolitan Munich. A total of 3021 participants aged 14–24 years (birth cohorts 1970–

1981) were successfully interviewed at baseline, resulting in a response rate of 71%. Since the study was designed with a special interest in early stages of substance use disorders, 14–15-year-olds were sampled at twice the probability of 16–21-year-olds, and 22–24-year-olds were sampled at half the probability. At baseline, almost threequarters of the participants were students, 36% at the secondary level and 26% at university, and 20% of the participants were employed. Nearly two-thirds (62%) were living with their parents, 23% were living alone, and 12% were living with their partner/spouse. The majority of the respondents were classified as middle class (59%), reflecting the population of Munich.

Two follow-up investigations were completed after the initial baseline assessment, covering an overall period of 42 months (range: 34–50 months). The first follow-up (t1) was conducted in 1996/1997 and confined to the younger subsample (aged 14–17 at baseline); 1228 interviews were completed, giving a follow-up response rate of 88%. The second follow-up (t2) included all baseline respondents and was conducted in 1998–99, an average of 42 months after the baseline investigation (range 34–50 months); the response rate was 83% (N=2548). Of these, 102 participants did not want to respond to questions about illicit drug use at t0, t1 or t2. Therefore, our dataset is N=2446 with regard to the longitudinal development of drug use/abuse across 3.5 years: 1101 participants in the younger cohort (aged 14–17 at baseline, born between 1977–1981), and 1345 in the older cohort (aged 18–24 at baseline, born between 1970– 1977). Data from all three assessments are used in this paper. Noteworthy changes in sociodemographic characteristics from baseline to second follow-up were only found for school/employment status (t2: secondary school: 13%, employed: 36%) and living arrangements (with parents: 40%; with partner: 23%).

2.3. Measures

Face-to-face computer-assisted interviews were administered by professional health interviewers and clinical psychologists at baseline and at the two follow- ups. Diagnostic assessments (t0–t1–t2) were based on the Munich version of the Composite International Diagnostic Interview (M-CIDI; Wittchen and Pfister, 1997). At baseline, lifetime and past 12 month substance-use, substance use disorders and other mental disorders were assessed according to DSM-IV criteria. In both follow-up investigations, substance use and diagnoses during the follow-up period(s) and for the previous 12 months were evaluated. The MCIDI is an updated version of the World Health Organization's CIDI version 1.2 (WHO-CIDI; World Health Organization, 1990), which incorporates questions to cover DSM-IV (American Psychiatric Association, 1994) and ICD-10 criteria. The reliability and procedural validity of the M-CIDI has been established (Lachner et al., 1998; Reed et al., 1998; Wittchen et al., 1998a).

Ecstasy use, abuse and dependence was assessed within the M-CIDI module L (illegal substances). Because ecstasy is pharmacologically related to amphetamines, as well as to hallucinogens and because ecstasy-pills often contain not only MMDA but as well other amphetamine derivates (Galliot-Guilley et al., 1999), ecstasy use was assessed in the context of two substance groups, namely group 2 'stimulants and related substances' (amphetamine, speed, ecstasy etc.) and group 7 'hallucinogens' (ecstasy, LSD, mescaline etc.). Therefore, our ecstasy-related results refer to those participants who stated that they either have taken stimulants (including ecstasy) or hallucinogens, specifically ecstasy; but frequency data always refer to both groups of substances (stimulants and hallucinogens), i.e., to ecstasy and related substances (see Schuster and Wittchen, 1996).

2.4. Data analysis

In line with the WHO-CIDI conventions (WHO 1990; Lachner et al., 1998), four mutually exclusive patterns of drug use were considered (never; one time; 2–4 times; five or more times). Additionally, the category of the '5+ times' users was subdivided into those with 'considerable' use (participant never consumed the relevant drug(s) more than two times during 1 week) or 'heavy' use (participant consumed substance(s) at least three times during 1 week) according to their peak ecstasy-use-per-week period. At second follow-up, the cumulative lifetime consumption of ecstasy and related substances was assessed: those subjects classified as having a 'considerable' lifetime use on average had consumed ecstasy/stimulants/hallucinogens 5–12 times (29.2%) or 13–50 times (25.0%; no information: 43.1%; N=72) and those classified as having a 'heavy' lifetime use actually had an use between 51–100 times (30.3%), 101–150 times (15.2%), 151–200 times (3.0%), 201–365 (12.1%) and > 356 times (6.1%; no information: 33.3%).

Lifetime prevalence at baseline denotes the rate of occurrence of a use pattern in the total sample or subsamples, and it covers the respondents' lifetime period prior to the assessment at baseline. Follow-up incidence of substance (ab)use was defined as new outcomes during the follow-up period (t0–t2) among nonusers at baseline. Cumulative lifetime incidence was calculated by adding baseline, t1 and t2 follow-up incident cases. Twelve-month prevalence rates at follow-up refer to the prevalence of drug use, abuse or dependence during the year preceding the t2-follow-up interview.

To account for different sampling probabilities for the different age-groups, non-contact and -response, all measures were estimated using weighted data. To account for design effects introduced by the use of weighted data, statistical inference was performed using the software package STATA (StataCorp, 1999) that applies the Huber–White sandwich matrix in this case (Royall, 1986). Survival analyses were used for the examination of age of onset data.

Age-specific cumulative lifetime incidences for ecstasy/ stimulant/hallucinogen use, abuse and dependence were estimated with the Kaplan-Meier method (Andersen and Keiding, 1996). Differences between curves were assessed with hazard ratios (HR) from the Cox proportional hazards model. The proportional hazards assumption, i.e., hazard ratios being independent of age, was tested with so-called Schoenfeld residuals (Grambsch and Therneau, 1994). When this assumption was violated for cohort differences, a stratified Cox model was used, i.e. different curves in age-cohorts were fitted before testing for group differences (Andersen and Keiding, 1996). In the case that the assumption was violated for gender differences the interaction term female gender x age was added to the model to test whether age is differently associated with the outcome for females as compared to males. A hazard ratio smaller than one then means that women have an earlier onset, conditional on the event that the outcome event is given.

3. Results

3.1. What is the age of onset of ecstasy/stimulant/hallucinogen use?

Fig. 1 shows the age-specific cumulative lifetime incidences for use of ecstasy/stimulants/hallucinogens by gender and birth cohort. First use was rarely reported before the age of 14. But afterwards, there was a steep increase in use which stagnated at age 24 for females and 26 for males.

Group differences in age of onset according to gender and birth cohort were analyzed with hazard ratios (HR). Cohort differences could only be analyzed for the period 0–21 years, the highest age reached by members of the younger cohort. With regard to use of ecstasy and related substances we found a significant cohort difference (HR=0.25, 95% confidence interval/CI=0.15– 0.41, P<0.05) as well as a gender effect (HR=0.58, CI=0.36–0.92, P<0.05; the proportional hazards assumption was not violated; Cox model stratified for year of birth). While fewer females then males started to use ecstasy and related drugs, of those who did, more girls started at an earlier age. The curve showing the increase of ecstasy use was steeper for the younger cohort than for the older group (Fig. 1).

3.2. How prevalent is ecstasy/stimulant/hallucinogen use in adolescence and young adulthood?

At baseline, 95.3% of the sample had never used ecstasy/stimulants/hallucinogens, 1.1% reported having used such a drug on a single occasion, 1.2% reported use '2–4 times', 2.0% reported a 'considerable' and 0.4% a 'heavy use' (see Table 1). The cumulative lifetime incidence by the second follow-up, roughly 4 years later, revealed a decrease in the proportion of subjects with no ecstasy use ever (90.9%), and an increase in the proportion of 5+ users ('considerable use': 4.1%; 'heavy use' 0.7%). Of the baseline non-users, 95.4% remained abstinent while 4.6% started using ecstasy and related drugs during the follow-up period; there were almost equal proportions of new users with rare use (one time: 1.2%; 2–4 times: 1.3%) and with regular use ('considerable': 1.8%; 'heavy': 0.3%). Taking the follow-up (t2) 12 -month prevalence as a rough measure for outcome and particular discontinuation, the fourth column of Table 1 reveals that only 2.8% of the entire sample had used ecstasy and related drugs during the year preceding the second follow-up, indicating that two thirds of all lifetime users had stopped their use during the previous 12 months.

Regardless of the time interval researched, men always described a slightly higher use of the drugs in question than women (OR=1.2–1.5). But this did only reach significance when risk for use was compared to non-use with regard to the cumulative lifetime incidence at the second follow-up (OR=1.4, 95% CI=1.0–1.9, P<0.05).

With regard to the risk for use versus non-use the older cohort had higher ecstasy use at baseline (OR= 3.9, CI=2.1–7.2, P<0.05), but with regard to cumulative lifetime incidence at follow-up, there were no significant cohort differences (OR=0.9, CI=.7–1.2). Concerning all other follow-up data (incidence among baseline non-users: OR=0.3, CI=0.2–0.5, P<0.05; 12-month follow-up prevalence: OR=0.5, CI=0.3– 0.9, P 0.05; follow-up prevalence: OR=0.5, CI= 0.3–0.7, P<0.05), there is a reversed effect: the younger cohort consistently had a higher risk of using ecstasy and related substances.

3.3. How prevalent is ecstasy/stimulant/hallucinogen abuse and dependence?

Rates of DSM-IV-defined ecstasy/stimulant/hallucinogen abuse and dependence at baseline and follow-up are shown in Table 2. At baseline, 0.5% of the sample fulfilled criteria for abuse (without dependence), and 0.4% for dependence. The cumulative lifetime incidence at follow-up (t2) reveals an increase with rates of 1.0% for abuse and 0.6% for dependence. The follow-up incidences among baseline non-users were low (abuse: 0.4%; dependence: 0.2%), as were follow-up (t2) 12-month prevalences (abuse: 0.3%; dependence: 0.04%).

With one exception (risk of dependence at baseline) men generally had a slightly higher risk of developing ecstasy abuse and dependence. But results did only reach significance for the

risk of abuse or dependence as compared to use without disorder with regard to follow-up cumulative lifetime incidence (OR=2.8, CI=1.2–6.8, P<0.05). With regard to the follow-up 12-month-prevalence this could not be assessed for the risk of dependence as compared to non-dependence because there were no female dependent participants.

We did not find any significant cohort difference with regard to fulfilling criteria for DSM-IV defined ecstasy/ stimulant/hallucinogen use disorders. But again, this could not be assessed for dependence at follow-up 12-month-prevalence because there were no dependent participants in this interval coming from the younger subgroup.

3.4. How stable are the patterns of ecstasy/stimulant/hallucinogen use, abuse and dependence across time?

Tables 3 and 4 report the findings on change over time in use of ecstasy and related substances by cross-tabulating cumulative lifetime incidence (assessed 12 months prior the second follow-up) and 12-months follow-up findings along with the estimated conditional probabilities (%) for four use patterns (no use, 1–4 times use, considerable use, heavy use; Table 3) and for four abuse patterns (no use, use without disorder, abuse without dependence, dependence; Table 4). In Table 3, a general tendency for stopping the use of ecstasy and related substances becomes visible: 99.2% of the prior abstinent participants remained abstinent, 87.7% of the prior 1–4 time users did not use these substances in the year preceding the second follow-up, as did 64.6% of those with a prior considerable use and 72.5% of those with a prior heavy use. This tendency can be found in both cohorts and both genders (When comparing the subgroups we did not find any non-overlapping confidence intervals which indicates that there are no significant cohort or gender differences; see Table 3).

With regard to abuse patterns (Table 4) a similar tendency appears: ecstasy users without a disorder tended to become non-users (79.8%). About 80% of those diagnosed as having had an ecstasy/stimulant/hallucinogen abuse had improved during the 12-months follow-up interval—mostly by becoming non-users (67.2%), less often by becoming users without disorder (14.9%); 17.9% remained abusers and none developed dependence. Of those with an initial (cumulative lifetime) dependence, 6.7% remained dependent, 7.5% moved to abuse without dependence, while half of this group showed total remission to no-use (50.0%) and 35.8% showed partial improvement to use without disorder. Again, we did not find any significant cohort or gender effects.

3.5. Is the cessation of ecstasy/stimulant use accompanied by a compensative increase in the use of other drugs or by a decrease?

Finally, it is important to assess whether ecstasy-abstinence in former consumers of ecstasy and related substances is compensated by increased levels of consumption of other illicit and licit drugs (Table 5). Ex-users of ecstasy/stimulants still consume more often nicotine (68.6 vs. 36.1%), cannabis (58.8 vs. 21.0%), sedatives (3.6 vs. 0.4%), cocaine (15.2 vs. 1.1%), hallucinogens (7.6 vs. 0.3%) and opiates (4.3 vs. 0.6%) when compared to those participants who have never used ecstasy and related drugs. But in the year before the second follow-up, ex-users have consumed other illicit drugs significantly less often than continuous users of ecstasy and related drugs did. This is the case with cannabis (58.8 vs. 83.6%), cocaine (15.2 vs. 71.5%), hallucinogens (7.6 vs. 37.0%) and inhalants (0.3 vs. 5.0%).

4. Discussion

In this paper data on the natural course of use, abuse and dependence of ecstasy and related substances (stimulants, hallucinogens) over 4 years are presented, from a prospective-longitudinal representative community sample of 2446 German adolescents, aged 14–24 at baseline and 17–28 at the second follow-up. Data was collected in personal interviews with an established reliable and valid standardized, computerized instrument (M-CIDI) (Wittchen and Pfister, 1997; Reed et al., 1998; Wittchen et al., 1998a). This study is the first to explore the longitudinal development of use and abuse of ecstasy and related substances in a representative community sample.

4.1. Limitations of the study

Some limitations of the study should be considered:

1. Due to the fact that self-report data on the use of ecstasy, stimulants and hallucinogens are imprecise and might not reflect the pharmacological ingredients, we decided to lump them together in most of the analyses. This is also in line with the observation that many consumers indicated that they have used these types of drugs anyhow (Schuetz et al., submitted).
2. Interpretation of some of the analyses for abuse and dependence of ecstasy and related drugs is hampered by the fact that relatively few cases developed a disorder.
3. Some attrition occurred from baseline to t2-followup that might have had an effect on the data. For example, users of any illicit drugs and participants with drug use disorders had a slightly but non-significant higher probability of not participating at the second follow-up (OR=1.5–1.7). Further, 102 participants of the study did not want to answer to questions about illicit drug use at one or more of the assessments. This potential selective attrition might have resulted in the description of a too favorable pattern of ecstasy/stimulant/hallucinogen use, abuse and dependence.
4. Complexity of the field work resulted in a relatively variable follow-up length (range: 34–50 months). Therefore, follow-up incidence data are reduced in their precision because they refer to varying time-intervals.

4.2. Prevalence of use and disorders of ecstasy and related substances in Germany

The overall cumulative lifetime incidence rate of 9.1% for use of ecstasy and related drugs (stimulants, hallucinogens) at the second follow-up for our then 17–28- year-old participants is higher than those found in other representative community samples. Kraus et al. (1998) described that 5.7% of West-German 21–24- year-olds have tried ecstasy and 6.5% amphetamines. In Spain, 5.7% of the 20–24-year-olds have ever have used designer drugs (de la Fuente et al., 1997). This might not necessarily mean that our cohorts consume such drugs more frequently but might also be related to the wider range of drugs taken into account in our study. Yet our findings are comparable to the higher estimates of adolescents' and young adults' ecstasy use in Europe, stemming from the UK (8–12%: Smart and Ogborne, 2000). In countries at the periphery of Europe (Finland, Czech Republic, Norway, Greece: 0–3%) and in the US and Canada (1–2%), ecstasy seems to be distinctly less popular (de la Fuente et al., 1997; Kokkevi et al., 2000b; NIDA, 1993; Pederson and Skrondal, 1999; Smart and Ogborne, 2000).

As most other researchers have reported, we also found that men use ecstasy and related substances more often than women do, although the gender difference is in our data less pronounced (10.8 males vs. 7.6% females ever had used ecstasy and related substances at

second follow-up) than the 3:1 ratio in Spain or the 2:1 ratio in Norway (de la Fuente et al., 1997; Pederson and Skrondal, 1999).

4.3. Use of ecstasy and related drugs—a transient phase-specific phenomenon?

The proportions of subjects who had stopped using these substances even after prolonged and heavy use in the course of our study is substantial. Our follow-up outcome analyses reveal that 88% of subjects with previous occasional use (1–4 times) of ecstasy and related drugs were found to be non-users in the 12 months preceding the second follow-up. Among those subjects that had previously been diagnosed as having had a DSM-IV diagnosis of ecstasy/stimulant/hallucinogen abuse, 67% reported no use of such drugs at follow-up. Only those persons previously classified as dependent were less likely to have stopped their drug use during the 12 months preceding the second follow-up: 50% stopped to use these substances and half continued (36% use, no disorder; 8% abuse; 7% dependence).

These discontinuation rates for ecstasy and related drugs are actually higher that those established for cannabis in our study. For example, only 54.7% of the prior cannabis users without disorder stopped to take cannabis over 4 years in our study, only 13.8% of the prior abusers and only 16.2% of those formerly classified as cannabis dependent (Sydow et al., in press). In each of these categories a higher percentage of ecstasy users stopped to use the drug(s) entirely (79.8, 67.2, 50.0%). We currently explore in additional analyses which factors are responsible for the higher discontinuation rates among ecstasy users focusing on the effects of costs for drugs, their availability as well as different attitudes to their use, particularly focusing on harmful health effects.

Overall, ages 16–23 were found to be the peak hazard ages for initiation of ecstasy/stimulant/hallucinogen use. Our considerably higher cumulative incidence data assessed at the second follow-up (t2) for CIDI-DSM-IV defined abuse (1.0%) and dependence (0.6%) from ecstasy and related substances in 17–28-year-olds cannot be compared to other data because such have not yet been published from other researchers.

It is remarkable that we found substantial birth cohort differences in previous analyses (Sydow et al., in press), with regard to the longitudinal pattern of cannabis use (the older cohort, born 1970–77, stopped cannabis use more often than the younger cohort, born 1977–81)— but not with regard to the use of ecstasy and related substances. Both cohorts showed the same pattern of stopping drug use. Our findings suggest: (1) that ecstasy use is usually initiated between 16 and 23 years of age; (2) the majority of users of ecstasy and related drugs do not develop a DSM-IV use disorder; (3) incident use as well as continued use of ecstasy is a characteristic of adolescents and young adults. These findings indicate that use of ecstasy and related substances is in line with the assumption that this behavior is frequently a transient, ‘youth-limited’ phenomenon. While this question has been extensively discussed and analyzed with regard to cannabis (Chen and Kandel, 1998; Hammer and Vaglum, 1990; Johnston et al., 1992; Kandel and Faust, 1975; Kandel and Logan, 1984; Moffitt, 1993; Perkonigg et al., 1999; Silbereisen, 1997; Sydow et al., in press) this study is the first to analyze this with regard to ecstasy and related drugs. Spontaneous changes from use to non-use occurred relatively often in our sample, more often as compared to the cessation of cannabis use. In this respect it is also noteworthy that we found no significant association that former users of ecstasy and related drugs compensate the cessation of their use of ecstasy by an increased use of other licit or illicit drugs.

4.4. The bad news

The ‘good news’ about significant rates of spontaneous cessation of ecstasy/stimulant/hallucinogen use in our sample is however offset by three problematic implications of our study.

4.4.1. Increasing use of ecstasy and related substances in younger German cohorts

We demonstrated a cohort effect with regard to the age of onset of use of ecstasy and related substances. The younger cohort (birth cohort 1977–81) tended to initiate ecstasy use at an earlier age than those born 1970–77.

4.4.2. Ecstasy use is accompanied by an elevated use of other licit and illicit drugs

Like several other researchers (Parrott et al., 2000; Schifano et al., 1998; Solowij et al., 1992; Thomasius, 2000; Topp et al., 1999; Tossmann, 1997), we found that ecstasy users when compared to non-users have significantly higher risks for use of other illicit substances like nicotine, cannabis, sedatives, cocaine, stimulants, hallucinogens and opiates. Although exusers of ecstasy and related substances tend to use less illicit drugs than continuous ecstasy-users, they still use nicotine, cannabis, hallucinogens, cocaine, sedatives and opiates more often than participants who have never used ecstasy and related drugs, despite the fact that we did not observe ‘compensatory increases’ after discontinuation of ecstasy use.

4.4.3. Existence of a high-risk group of long-time consumers of ecstasy

There is a significant proportion of lifetime ecstasy users (15%) who were long-time consumers of ecstasy and related drugs, classified as ‘considerable’ or ‘heavy users’ before the 12-months preceding the last assessment (t2) and afterwards. Of these, more than one third fulfilled DSM-IV criteria of abuse or dependence from ecstasy and related drugs over more than 1 year. This subsample with long-time elevated use of ecstasy and related drugs and presumably of other licit and illicit drugs as well has to be considered as a problematic high-risk group raising clinical and public health concerns.

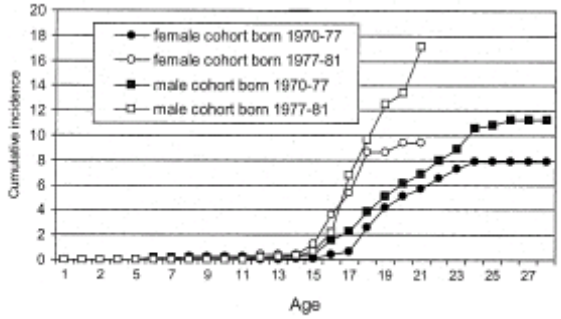

Fig. 1. Age of onset of use of ecstasy and related substances.

Table 1
Use of ecstasy and related substances at baseline (*t*0) and follow up (*t*2) (*N* = 2446)

(Sub)groups			Baseline (*t*0) prevalence			Follow-up (*t*0–*t*1–*t*2) cum. lifetime incidence			Follow-up (*t*2) incidence among baseline non-users			Follow-up (*t*2) 12-month prevalence		
			N	%w	95% CI	*N*	%w	95% CI	*N*	%w	95% CI	*N*	%w	95% CI
Total	Total	Never use	2357	95.3	(94.1–96.2)	2239	90.9	(89.5–92.1)	2239	95.4	(94.4–96.2)	2378	97.3	(96.5–97.9)
		One time-use	17	1.1	(0.7–1.7)	45	1.9	(1.4–2.6)	33	1.2	(0.8–1.8)	11	0.3	(0.2–0.7)
		2–4 times use	27	1.2	(0.8–1.9)	58	2.4	(1.8–3.2)	37	1.3	(0.9–1.9)	29	1.2	(0.8–1.7)
		Considerable use	38	2.0	(1.5–2.8)	90	4.1	(3.3–5.1)	43	1.8	(1.3–2.5)	26	1.2	(0.8–1.8)
		Heavy use	7	0.4	(0.2–0.9)	14	0.7	(0.4–1.3)	5	0.3	(0.1–0.7)	2	0.1	(0.0–0.3)
Age groups	14–17 years	Never use	1088	98.3	(97.0–99.0)	1007	90.0	(87.8–91.9)	1007	91.6	(89.5–93.3)	1063	95.9	(94.3–97.1)
		One time-use	1	0.2	(0.0–1.3)	23	2.2	(1.5–3.4)	23	2.3	(1.5–3.5)	9	0.8	(0.4–1.5)
		2–4 times use	4	0.4	(0.2–1.2)	27	2.7	(1.8–4.0)	25	2.5	(1.6–3.8)	15	1.7	(1.0–2.9)
		Considerable use	8	1.1	(0.5–2.2)	41	4.7	(3.4–6.5)	30	3.3	(2.2–4.8)	14	1.6	(0.9–2.8)
		Heavy use				3	0.4	(0.1–1.2)	3	0.4	(0.1–1.2)	–		
	18–24 years	Never use	1269	94.0	(92.4–95.2)	1232	91.2	(89.5–92.8)	1232	97.1	(95.9–97.9)	1315	97.8	(96.9–98.5)
		One time-use	16	1.4	(0.9–2.4)	22	1.8	(1.1–2.7)	10	0.8	(0.4–1.5)	2	0.2	(0.0–0.6)
		2–4 times use	23	1.6	(1.0–2.5)	31	2.3	(1.5–3.3)	12	0.8	(0.5–1.5)	14	0.9	(0.6–1.6)
		Considerable use	30	2.4	(1.7–3.5)	49	3.9	(2.9–5.1)	13	1.1	(0.6–2.0)	12	1.0	(0.5–1.8)
		Heavy use	7	0.6	(0.3–1.3)	11	0.9	(0.5–1.7)	2	0.2	(0.0–1.0)	2	0.1	(0.0–0.4)
Gender groups	Male	Never use	1196	94.2	(92.4–95.6)	1130	89.3	(87.1–91.1)	1130	94.8	(93.2–96.0)	1207	96.6	(95.3–97.5)
		One time-use	11	1.2	(0.6–2.1)	28	2.3	(1.5–3.4)	20	1.5	(0.9–2.4)	7	0.4	(0.2–1.0)
		2–4 times use	17	1.5	(0.9–2.6)	29	2.5	(1.7–3.7)	16	1.2	(0.7–2.1)	19	1.7	(1.0–2.7)
		Considerable use	21	2.5	(1.6–3.8)	56	5.2	(3.9–6.9)	28	2.4	(1.5–3.6)	17	1.3	(0.8–2.2)
		Heavy use	5	0.6	(0.2–1.6)	7	0.8	(0.4–1.8)	2	0.2	(0.0–0.7)	–		
	Female	Never use	1161	96.3	(94.7–97.4)	1109	92.5	(90.6–94.0)	1109	96.0	(94.7–97.1)	1171	97.9	(96.8–98.7)
		One time-use	6	1.0	(0.4–2.2)	17	1.6	(0.9–2.6)	13	1.0	(0.5–1.7)	4	0.2	(0.1–0.7)
		2–4 times use	10	1.0	(0.5–1.9)	29	2.3	(1.5–3.4)	21	1.4	(0.9–2.3)	10	0.7	(0.4–1.3)
		Considerable use	17	1.6	(1.0–2.6)	34	3.0	(2.1–4.3)	15	1.2	(0.7–2.1)	9	1.0	(0.5–2.0)
		Heavy use	2	0.2	(0.1–0.9)	7	0.7	(0.3–1.6)	3	0.4	(0.1–1.3)	2	0.1	(0.0–0.6)

N indicates unweighted number; %w indicates weighted percentage; CI indicates confidence interval. Information about the weighted *N* can be obtained from the first author. Considerable use, peak time use ≤2 times per week; heavy use, peak time use >2 times per week.

Table 2
Abuse and dependence of ecstasy and related substances at baseline (*t*0) and follow-up (*t*2) (*N* = 2446)

(Sub)group			Baseline (*t*0) prevalence			Follow-up (*t*0–*t*1–*t*2) cum. lifetime incidence			Follow-up (*t*2) incidence among baseline non users			Follow-up (*t*2) 12-month prevalence		
			N	%w	95% CI	*N*	%w	95% CI	*N*	%w	95% CI	*N*	%w	95% CI
Total	Total	Use, no disorder	74	3.9	(3.1–5.0)	171	7.5	(6.4–8.8)	102	4.0	(3.2–5.0)	59	2.4	(1.8–3.2)
		Abuse wo dep	8	0.5	(0.2–1.0)	24	1.0	(0.7–1.6)	11	0.4	(0.2–0.7)	8	0.3	(0.1–0.6)
		Dependence	7	0.4	(0.2–0.8)	12	0.6	(0.3–1.0)	5	0.2	(0.1–0.5)	1	0.0	(0.0–0.3)
Age groups	14–17 years	Use, no disorder	11	1.4	(0.8–2.6)	79	8.3	(6.6–10.3)	69	7.2	(5.6–9.1)	34	3.6	(2.5–5.2)
		Abuse wo dep	1	0.2	(0.0–1.3)	12	1.4	(0.8–2.6)	10	1.1	(0.6–2.1)	4	0.5	(0.2–1.3)
		Dependence	1	0.1	(0.0–1.0)	3	0.3	(0.1–1.1)	2	0.2	(0.0–0.8)	–		
	18–24 years	Use, no disorder	63	5.0	(3.8–6.4)	92	7.2	(5.9–8.9)	33	2.7	(1.8–3.8)	25	1.9	(1.2–2.9)
		Abuse wo dep	7	0.6	(0.3–1.3)	12	0.9	(0.5–1.6)	1	0.1	(0.0–0.5)	4	0.2	(0.1–0.6)
		Dependence	6	0.5	(0.2–1.0)	9	0.7	(0.3–1.3)	3	0.2	(0.1–0.7)	1	0.1	(0.0–0.4)
Gender groups	Male	Use, no disorder	42	4.4	(3.2–6.0)	92	8.2	(6.5–10.1)	55	4.4	(3.3–5.9)	36	2.9	(2.0–4.1)
		Abuse wo dep	8	1.0	(0.5–1.9)	20	1.8	(1.1–2.9)	7	0.5	(0.2–1.1)	6	0.4	(0.2–1.0)
		Dependence	4	0.4	(0.2–1.2)	8	0.8	(0.4–1.6)	4	0.3	(0.1–1.0)	1	0.1	(0.0–0.5)
	Female	Use, no disorder	32	3.5	(2.4–5.0)	79	6.9	(5.5–8.8)	47	3.6	(2.6–4.9)	23	1.9	(1.2–3.0)
		Abuse wo dep	–			4	0.3	(0.1–0.7)	4	0.3	(0.1–0.7)	2	0.2	(0.0–0.7)
		Dependence	3	0.3	(0.1–0.9)	4	0.4	(0.1–1.0)	1	0.1	(0.0–0.6)	–		

N indicates unweighted number; %w indicates weighted percentage; CI indicates confidence interval. Information about the weighted *N* can be obtained from the first author.

Table 3
Longitudinal development of ecstasy/stimulant/hallucinogen use: cross-tabulation of cumulative incidence 12 months prior to second follow-up and 12 months follow-up prevalence ($N = 2446$)

(Sub)group	Cumulative lifetime incidence 12 months prior $t2$ assessment	12-months status at second follow-up ($t2$)							
		No use		1–4 times use		Considerable use		Heavy use	
		N	%w	*N*	%w	*N*	%w	*N*	%w
Total	Never use	2239	99.2	16	0.6	4	0.1	1	0.1
	1–4 times use	82	87.7	11	9.0	4	2.2	1	1.1
	Considerable use	50	64.6	12	15.6	14	19.2	1	0.6
	Heavy use	7	72.5	1	6.9	2	13.2	1	7.3
14–17 years at baseline	Never use	1007	98.6	11	1.1	3	0.3	0	0.0
	1–4 times use	35	74.3	8	16.0	4	6.4	1	3.3
	Considerable use	20	62.0	5	18.8	5	19.3	0	0.0
	Heavy use	1	37.7	0	0.0	1	62.3	0	0.0
18–24 years at baseline	Never use	1232	99.4	5	0.3	1	0.1	1	0.2
	1–4 times use	47	94.5	3	5.5	0	0.0	0	0.0
	Considerable use	30	65.7	7	14.3	9	19.1	1	0.9
	Heavy use	6	76.7	1	7.8	1	7.3	1	8.2
Male	Never use	1130	99.0	9	0.8	3	0.2	0	0.0
	1–4 times use	44	82.6	9	12.5	3	2.9	1	2.0
	Considerable use	29	65.6	8	17.6	8	16.7	0	0.0
	Heavy use	4	78.5	0	0.0	2	21.5	0	0.0
Female	Never use	1109	99.3	7	0.4	1	0.1	1	0.2
	1–4 times use	38	94.1	2	4.7	1	1.2	0	0.0
	Considerable use	21	62.9	4	12.4	6	23.0	1	1.7
	Heavy use	3	62.8	1	18.1	0	0.0	1	19.1

Information about the weighted *N*'s and the 95% confidence intervals can be obtained from the first author.

Table 4
Longitudinal development of ecstasy/stimulant/hallucinogen abuse and dependence: cross-tabulation of cumulative lifetime incidence 12 months prior to the $t2$-assessment and 12-months status at $t2$ ($N = 2446$)

Gender	Cumulative lifetime incidence 12 months prior $t2$ assessment	12-months status at second follow-up ($t2$)							
		No use		Use, no disorder		Abuse, no dependence		Dependence	
		N	%w	*N*	%w	*N*	%w	*N*	%w
Total	Never use	2239	99.2	20	0.8	1	0.1	0	0.0
	Use, no disorder	119	79.8	32	19.6	2	0.6	0	0.0
	Abuse, no dependence	14	67.2	3	14.9	4	17.9	0	0.0
	Dependence	6	50.0	4	35.8	1	7.5	1	6.7
14–17 years at baseline	Never use	1007	98.6	14	1.4	0	0.0		
	Use, no disorder	46	66.4	19	31.6	2	2.1		
	Abuse, no dependence	7	69.2	1	6.2	2	24.6		
	Dependence	3	100.0	0	0.0	0	0.0		
18–24 years at baseline	Never use	1232	99.4	6	0.5	1	0.1	0	0.0
	Use, no disorder	73	85.6	13	14.4	0	0.0	0	0.0
	Abuse, no dependence	7	65.9	2	20.6	2	13.5	0	0.0
	Dependence	3	40.0	4	43.0	1	9.1	1	8.0
Male	Never use	1130	99.0	12	1.0	0	0.0	0	0.0
	Use, no disorder	61	77.9	19	20.9	2	1.2	0	0.0
	Abuse, no dependence	11	64.1	3	16.3	4	19.6	0	0.0
	Dependence	5	63.4	2	26.8	0	0.0	1	9.9
Female	Never use	1109	99.3	8	0.6	1	0.1		
	Use, no disorder	58	81.9	13	18.1	0	0.0		
	Abuse, no dependence	3	100.0	0	0.0	0	0.0		
	Dependence	1	22.0	2	54.7	1	23.3		

Table 5
Use of other drugs during the past 12 months (*t2*): Odds Ratios (OR)

	Ex vs. never ES users		Continuous vs. never ES users		Continuous vs. ex ES users		Never ES user $N = 2239$ (%w)	Ex-ES user $N = 139$ (%w)	Continuous ES user $N = 47$ (%w)
	OR[b]	95% CI	OR[b]	95% CI	OR[b]	95% CI			
Nicotine	3.9*	(2.6–6.0)	6.9*	(3.1–15.4)	1.8	(0.7–4.3)	36.1	68.6	80.3
Alcohol	1.2	(0.8–2.0)	2.6*	(1.0–6.4)	2.3	(0.8–6.5)	77.3	80.4	90.3
Cannabis	6.3*	(4.2–9.4)	18.8*	(7.6–46.6)	3.2*	(1.2–8.5)	21.0	58.8	83.6
Sedatives	1.7	(0.2–14.1)	5.5	(0.6–47.8)	0.6	(0.1–6.3)	0.4	3.6	2.0
Opiates	2.2	(0.5–10.3)	11.6*	(3.5–37.9)	1.7	(0.4–7.1)	0.6	4.3	6.9
Cocaine	12.2*	(5.8–25.6)	219.7*	(99.6–484.7)	14.7*	(6.3–34.6)	1.1	15.2	71.5
Pcp					2.9	(0.2–36.8)	0.0	0.7	1.9
Hallucinogens [a]	17.3*	(5.3–56.8)	222.6*	(75.5–656.2)	6.5*	(2.5–17.1)	0.3	7.6	37.0
Inhalants					13.4*	(1.1–162.8)	0.0	0.3	5.0
Other	2.5	(0.5–13.8)	3.9	(0.5–32.5)	1.6	(0.1–18.6)	0.4	0.9	1.5

E, ecstasy; S, stimulants.
[a] Exclusive XTC.
[b] Controlled for age and gender.

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